EASTMOUNT ENVIRONMENTAL SERVICES
Air Quality Specialists

TEST PROTOCOL

VOC and HAP Emissions Testing from Residual Oil and Asphalt Storage Tank Headspace and Loading Operations at the Global Companies LLC South Portland, Maine Terminal

Prepared for . . .

Global Companies LLC
800 South St. Suite 200
P.O. Box 9161
Waltham, MA 02454-9161

Prepared by . . .

Eastmount Environmental Services, LLC
January 31, 2012
Project No. 12-009

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1.0 INTRODUCTION

1.1 General

Eastmount Environmental Services, LLC of Newburyport, MA has been retained by Global Companies LLC (Global) of Waltham, MA to conduct emissions testing at their South Portland, Maine terminal. Testing will be conducted to establish the emission rate of volatile organic compounds (VOC) and hazardous air pollutants (HAP) from the headspace emissions of a residual oil (or No. 6 oil) storage tank and an asphalt storage tank as well as from truck loading.

Testing is being conducted in response to an EPA testing order for information under Section 114 of the Clean Air Act dated November 2, 2011.

The program will focus on one of two exhaust vents on the residual oil storage tank (Tank No. 3) and the single exhaust vent on the asphalt storage tank (Tank No. 9). Additionally, tanker truck filling processes will be quantified from each tank.

A summary of the primary parties involved in this test program is presented in Table 1-1.

1.2 Program Overview

The objective of the emission test program is to gather VOC and HAP emissions information from a residual oil storage tank and an asphalt storage tank under a variety of test scenarios as defined below:

1) The VOC concentration will be continuously monitored over a proposed 15-day period at a single storage tank exhaust vent. Measurements will commence at least 24 hours prior to a scheduled tank filling, and will continue during and after the tank filling process for a total of 15 test days. Although the EPA has specified a 30-day continuous sampling period, it is Global's goal to demonstrate that VOC emissions remain constant and unchanged over a 15-day continuous monitoring period to satisfy the sampling requirement. EPA Methods 1, 2C, 3A, 4 (modified), 18, and 25A will be utilized for sampling. Volumetric flow rate measurements will be conducted in accordance with EPA Method 2C at a frequency of at least three times per 24-hour period (please refer to Section 1.3 of this document for additional details on flow measurement). Results will be reported in units of ppmv non-methane hydrocarbons (in terms of methane or propane) and lbs/hr.

2) Three samples will be collected from the storage tank vent in a prepared Summa canister, and will be analyzed for HAPS in accordance with EPA Method TO-15. Results of each compound will be reported in units of concentration and mass emission rate.

3) The VOC concentration and emission rate from truck l loading operations will be quantified during ten filling cycles. Similar to the tank testing, whereby the EPA has specified a 30-day continuous sampling period, it is Global's goal to demonstrate that VOC emissions remain constant and unchanged during ten truck filling events over the 15 day test period. Samples will be collected from the open tank hatch in Mylar bags, and analyzed for ppmv non-methane hydrocarbons (in terms of methane or propane) using EPA Methods 18 and 25A. Tank exhaust volumetric flow rate will be calculated based in the oil fill rate of the tank resultant displacement of air.

Testing will be conducted in strict accordance with approved test protocol, the EPA Quality Assurance Handbook, and the individual EPA Methods as found in 40 CFR 60, Appendix A. A summary of the test parameters and methodology are presented in Table 1-2.

1.3 Discussion of Volumetric Flow Measurement

Although the VOC and HAP testing proposed herein is not technically difficult, obtaining representative volumetric flow from the storage tank exhaust vent during passive breathing periods (i.e. not during transferring of oil into the tank) will be challenging as the anticipated flow rate will be extremely low. Eastmount researched a variety of measurement techniques as defined below:

<u>Turbine meter</u> – Will provide 2% accurate measurement at 750 CFH. Below that, accuracy will drop dramatically. Anticipated exhaust vent flow rate is less than 600 CFH.

<u>Roots meter</u> – A displacement meter that will require the exhaust vent diameter to be reduced to 2 inches to accommodate the in-line device. If meter jams, it will block venting entirely which poses a safety concern (i.e., tank collapse). May restrict vapor pressure flow. Would need to be removed during fuel transfer.

<u>Ultrasonic flow meter</u> – Will not provide reliable sensitivity in air streams at low flow.

<u>Hot wire anemometer</u> – Not intrinsically safe.

<u>Pitot tube / micro-transducer</u> – The zero will likely drift over short periods. Water droplets may block standard pitot openings (8% moisture at 130°F in tank head space is anticipated). Exhaust vent diameter will need to be no more than 4 inches for detection. This diameter may need to be increased during fuel transfer operations to prevent over-pressurizing the storage tank.

Eastmount proposes to use a 1/8” diameter standard pitot tube with a micro-pressure transducerwith a minimum sensitivity of 0.001 inches H_2O. Global will construct a Temporary Total Enclosure (TTE) around the subject vent(s) on each of the subject storage tanks. Tank No. 3 (Residual Tank) has two identical exhaust vents, and Tank No. 9 (Asphalt Tank) has a single exhaust vent. A TTE will be constructed around all three vents. Each TTE will be fitted with a 4-inch diameter exhaust pipe from which VOC concentration and volumetric flow rate will be measured. Based on the 4-inch diameter, the minimum flow detection will be approximately 10 cfm. Emissions from the No. 3 Residual Tank will be measured from a single vent, and the results will be doubled to represent total emissions from the tank.

The exhaust vent diameter may need to be increased during fuel transfer operations to prevent excess pressure (or vacuum on the tank).

1.4 Protocol Organization

The remainder of this Protocol is divided into three additional sections. A description of the sampling locations is presented in Section 2. Emissions exhaust monitoring procedures are presented in Section 3. Section 4 addresses the quality assurance/quality control aspects of the program. Section 5 describes the safety provisions for conducting the work. Appendix A contains a copy of the EPA 114 letter (dated 11-2-2011). Appendix B contains sample calculation sheets, field data sheets, and equipment calibrations.

Table 1-1 Test Program Informational Summary

Source Information	
Facility Representative:	Global Companies LLC
Address:	800 South Street, Suite 200 P.O. Box 9161 Waltham, MA 02454-9161
Contact:	Mr. Tom Keefe Director of EHS Operations
Phone:	(781) 398-4123
Test Site Information	
Test Organization:	Global Companies LLC
Address:	1 Clark Road South Portland, ME 04106
Contact:	Mr. Bruce Yates Terminal Manager
Phone:	(207) 767-8259
Test Firm Information	
Test Organization:	Eastmount Environmental Services, LLC
Address:	2 New Pasture Road, Unit 5 Newburyport, MA 01950
Contact:	Mr. Anthony M. Stratton Vice President – Technical Services
Phone:	(978) 499-9300 x12
Email:	astratton@eastmount.com
Regulatory Information	
Organization:	US EPA New England Regional Lab
Address:	11 Technology Drive North Chelmsford, MA 01863-2431
Contact:	Mr. William Osbahr
Phone:	(617) 918-8389

Table 1-2 Summary of Parameters and Test Methodologies

Test Location	Parameter	Test Method	Number of Runs
Storage Tank Exhaust Vent	Total Hydrocarbons	EPA 25A	Continuous sampling over 15 days
	Methane	EPA 18	
	Volumetric Flow	EPA 2C	3 or more times per day
	VOC HAPS	EPA TO-15	3 Summa canister
Tanker Truck Exhaust Vent	Total Hydrocarbons	EPA 25A (Mylar Bags)	10 Bags over 10 tanker truck filling cycles
	Methane	EPA 18 (Mylar Bags)	
	Volumetric Flow	Calculated based on tank volume displacement	
	VOC HAPS	None—will assume to be the same as the tank headspace	

2.0 PROCESS DESCRIPTION AND SAMPLING POINT CONFIGURATION

2.1 Facility Description

The Global South Portland petroleum terminal handles distillate and residual oil products, and asphalt. The terminal operates under the Standard Industrial Classification Code (SIC) 5171, Petroleum Bulk Stations and Terminals. The facility receives products by ship or barge and stores the products in twelve (12) heated and non-heated fixed roof petroleum storage tanks. Products are then loaded into over-the-road tank trucks through a truck loading rack or into barges for marine transport.

2.2 Sampling Location Description

2.2.1 Storage Tank Exhaust Vent – Residual and Asphalt Storage Tanks

Storage Tank No. 3 (Residual Oil) is fitted with two identical exhaust vents on the tank roof. Storage Tank No. 9 (Asphalt Tank) is fitted with a single exhaust vent. Each vent is configured as a “mushroom” vent. Global has elected to construct a Temporary Total Enclosed (TTE) around each vent to avoid costly re-building of the existing vents. Each TTE will be fitted with an exhaust duct of 4 inches in diameter and approximately 60 inches in length (or 15 duct diameters). Each duct will be fitted with two sampling ports situated 90° apart, meeting or exceeding the EPA Method 1 criteria of 8 duct diameters from the upstream disturbance (bend in duct) to the ports, and 2 diameters from the ports to the downstream disturbance (duct exhaust). The exact dimensions will be verified prior to testing.

Figure 2-1 presents an image of the exhaust vent on Residual Tank No. 3. Figure 2-2 presents an image of the exhaust vent on Asphalt Tank No. 9. Figure 2-3 depicts the proposed temporary total enclosures that will be constructed around the subject exhaust vents.

2.2.2 Tanker Truck Exhaust Vent

During tanker truck filling from the storage tank, VOC emissions will be measured by lowering a sample line into the tanker headspace through the hatch on top of the truck.

Figure 2-1 Residual Storage Tank (Tank #3) Exhaust Vent (one of two)

Figure 2-2 Asphalt Storage Tank (Tank #9) Exhaust Vent

Figure 2-3 Proposed Temporary Total Enclosures for Tank Nos. 3 and 9

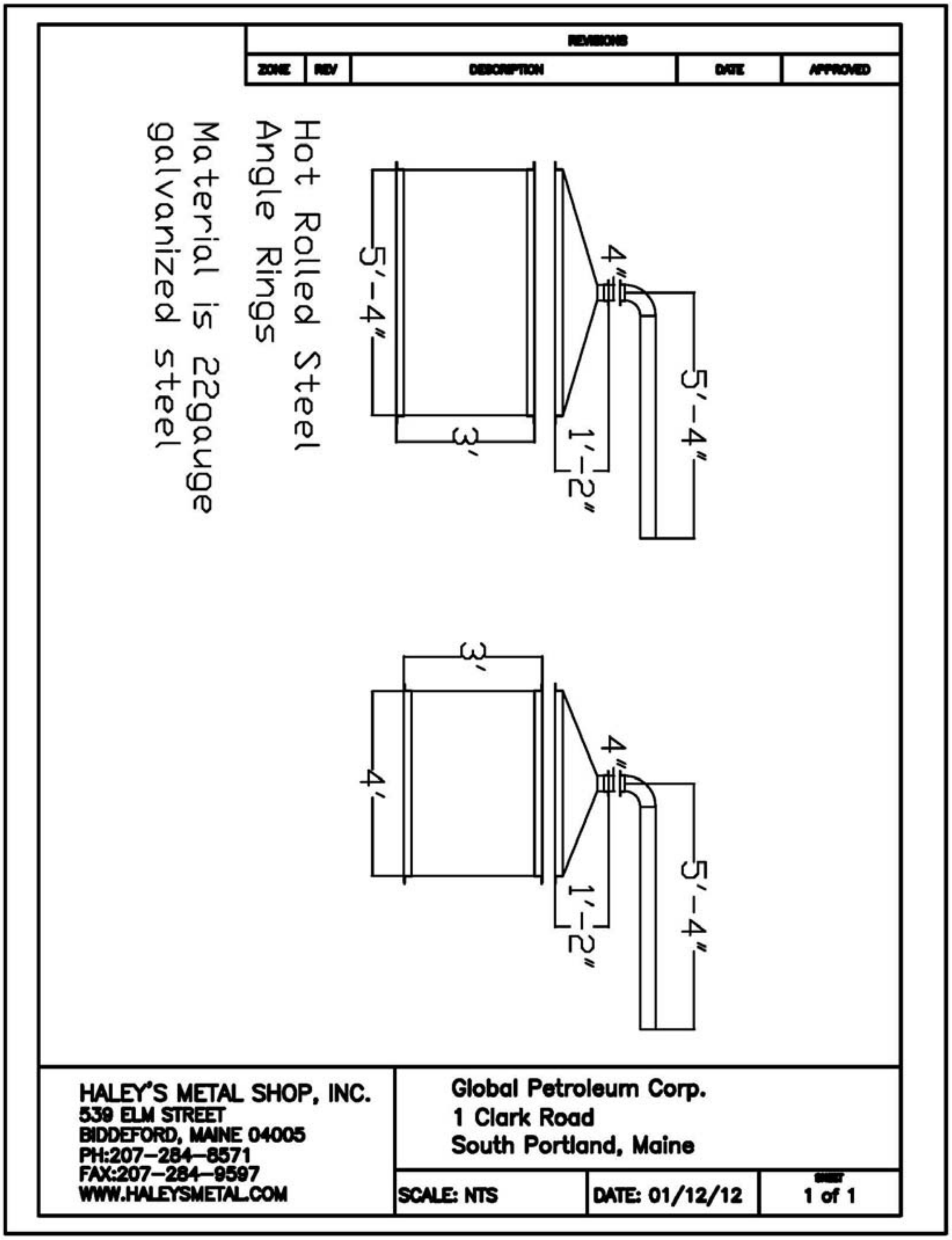

Table 2-1 Sampling Configuration – Storage Tank Exhaust Vent TTE Exhaust

Inlet Sampling Points –		
Description	**Distance**	**Equivalent Diameters**
Upstream (A)	To be determined	$\geq$ 2.0
Downstream (B)	To be determined	$\geq$ 8.0
Diameter (C)	Based on 4 inches *	NA
Number of Ports	2	NA
Flow Traverse Points (based on 4” diameter)		
Traverse Point	**% of Diameter**	**Distance From Inside Wall**
1	6.7	0.3
2	25.0	1.0
3	75.0	3.0
4	93.3	3.7

Other Notables:

- **THC and methane will be sampled at a single point within the centroidal area of the duct.**
- **The dry molecular weight of the gas is assumed to be ambient.**
- **Moisture will be calculated via wet/dry bulb approximation technique.**

* Temporary total enclosure exhaust

3.0 TEST PROCEDURES

3.1 Overview

Emissions testing will be conducted to determine the VOC and HAP concentration and mass emission rate of the subject processes. Each parameter will be measured in strict accordance with official EPA procedures at the sampling locations previously described. This section details the test procedures that will be used during this test program.

3.2 Methodology

3.2.1 Non-Methane Volatile Organic Compounds – EPA Methods 25A and 18

Non-methane volatile organic compounds (NMVOC) will be measured at the storage tank exhaust vent and the tanker truck open hatch. VOC will be determined in accordance with EPA Method 25A. Eastmount will meet the requirements of Method 25A by utilizing one VIG Model 200 Flame Ionization Detector (FID) analyzer. The analyzer will be calibrated with three certified standards of methane in balance air at the beginning of each day, and periodically through each 24-hour period as needed to maintain sample integrity. All calibrations will be performed in accordance with Method 25A and will meet or exceed Method 25A accuracy criteria. All data will be logged on a computer.

The methane concentration will be determined in accordance with EPA reference Method 18. Eastmount will utilize an internal gas chromatograph (GC) column in the VIG Model 200 to determine methane concentrations. The system will be calibrated using three certified standards of methane introduced to the GC. The GC will be fully calibrated at the beginning and end of the test day. Sample injections occur every three minutes. All data will be logged on a computer.

Eastmount will use a standard EPA Method 25A sampling train on the storage tank vent, where a heated sample line will be used to deliver the sample from the vent to the analyzer. For sampling on the tanker truck during filling, Eastmount will collect integrated samples in Mylar sample bags using an evacuated canister and calibrated pump. That sample will be introduced to the VOC analyzer directly after collection.

3.2.2 Volumetric Flow Rate

Volumetric flow rate will be measured from the storage tank exhaust vent in accordance with EPA Method 2C. Eastmount will use an 1/8" diameter standard pitot tube and a calibrated Dwyer (or equivalent) micro-pressure transducer with a range of 0 to 0.25", and sensitivity of 0.001" w.c. to measure the exhaust vent headspace flow rate during idle periods (no fuel being transferred). During fuel transfer periods, an inclined manometer and/or a calibrated pressure transducer with a range of 0 to 5 inches w.c. and a sensitivity of 0.01" w.c. will be used to measure flow. Additionally flow rate will be compared using the calculated amount of air being displaced during fuel transfer into the tank, The typical product transfer flow rates from a ship 6,000 barrels/hr (4,200 gallons per minute).

Eastmount anticipates conducting at least three flow traverses daily. More traverses may be conducted if variable flow rate is demonstrated throughout the day. Prior to each traverse, the system will be purged of any moisture, leak-checked, and zeroed. Data will be recorded manually on template field data sheets.

Volumetric flow during truck loading operations is assumed to bet the flow of product into the truck, as the liquid will displace any vapor in the truck during transfer.

In addition to velocity pressure measurements, Eastmount will measure gas temperature using a calibrated K-type thermocouple, and gas moisture using the wet bulb/dry bulb psychrometric technique.

3.2.3 VOC HAPS - EPA TO-15

Hazardous air pollutants (HAPS) will be determined by collecting three samples in a prepared and pre-evacuated Summa canister with a pre-calibrated flow meter to allow canister filling for 60 minutes. The sample will be delivered to the canister via a short length using ¼" OD Teflon tubing.

Analysis of VOCs will be determined by utilizing EPA Method TO-15 by Gas Chromatography / Mass Spectrometry (GC/MS). Each Summa sample will be analyzed for all compounds on the EPA TO-15 list.

3.3 Description of VOC and Methane Sampling

3.3.1 VOC and Methane Sampling System

What follows is a description of the transportable continuous emissions monitor system used to quantify VOC and methane emissions. The system meets all the specifications of Reference Method 18 and 25A:

- **Probe -** A stainless steel probe will be used at the sampling location. The probe will be of sufficient length to reach the centroidal area of duct.

- **Calibration Tee** - Stainless steel tee (3/8") located between the probe and the sample line will allow the operator to inject calibration gas through the entire sampling system. Excess calibration gas exits the probe eliminating any potential over pressurization.

- **Sample Line -** A heated 3/8" OD Teflon sample line will be used to transport the sample stream from the test locations to the analyzer. The line will be heated to approximately 250°F to prevent condensation of hydrocarbons before reaching the analyzer.

- **System Calibration Line -** A ¼" OD Teflon tube will be used to transfer calibration gas from the cylinder to the calibration valve.

- **Sample Pump** - A leak-free pump will be used to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the measurement system. The components of the pump that contact the gas stream are constructed of stainless steel or Teflon. The sample pump is heated to prevent condensation.

- **THC Analyzer –** One VIG Model 200 flame ionization analyzer (FIA) will be used.

- **Data Acquisition System (DAS) –** The VOC analyzer's response will be recorded on a Dell Inspiron 1710, computer working in unison with an Iotech Data Acquisition System. This system is programmed to collect data once every 2 seconds, while reporting 1-minute averages. This software operates in a Windows environment.

3.3.2 VOC and Methane Sampling Procedures

The FID will be calibrated prior to sampling using zero, low, mid and high methane in air calibration gases certified in accordance with EPA Protocol procedures. Calibrations will be conducted through the entire sample system. A description of the specific procedures is provided below:

- **Zero:** The zero point of the analyzer will be determined using a pre-purified cylinder of air. The zero point will be analyzed for a minimum of five minutes to monitor drift before sampling commences.

- **High:** The high calibration gas will be 80-90% of span. It will be introduced to the sample system and the response of the analyzer will be adjusted accordingly.

- **Low:** The low calibration gas will be 25-35% of span. It will be introduced to the sample system and the response of the analyzer will be recorded.

- **Mid:** The mid calibration gas will be 45-55% of span. It will be introduced to the sample system and the response of the analyzer will be recorded.

Once the analyzer is calibrated, the system will be switched to sample mode and sampling will commence. The response time of the system will be determined from the time the valve will be actuated to the time the response of the FIA is 95% of the steady state sample value. The DAS will then record the analyzer response throughout the test run. Following the test run, the sampling system will be post calibrated. The post calibration will consist of delivering zero and a representative upscale calibration point through the entire sampling system and recording the system response. This response will be used in conjunction with the initial system calibration in order to determine calibration drift over the test run period.

3.4 Reference Method Volumetric Flow Determination

In conjunction with VOC monitoring, Eastmount will conduct a flow traverses in accordance with EPA Methods 1-2C, 40 CFR 60, Appendix A. The following is a description of the individual components that comprise the sampling train.

3.4.1 Velocity and Temperature Profile

Eastmount will conduct volumetric flow rate determinations during this test program in accordance with procedures delineated in EPA Methods 1 and 2C, 40 CFR 60, Appendix A. The system components necessary to conduct this testing are detailed below.

- **Pitot Tube –** A micro-standard pitot tube will be used to measure gas velocities. A pitot coefficient of 0.99 will be used.
- **Pitot Lines -** The pitot tube will be connected to a micro-pressure transducer (or manometer) via leak free Tygon or teflon tubing.
- **Pressure Transducer –** A pressure transducer with a range of 0-0.25” w.c. and a 0.001” w.c. sensitivity will be used to measure the velocity pressure drop. If the velocity pressure exceeds 0.25” w.c., a pressure transducer with a 0-.5” w.c. range and 0.01” w.c. sensitivity will be used. An inclined manometer may also be used if flow is detected with this device..
- **Thermocouple -** A "K" type thermocouple will be used to monitor the gas temperature at each traverse point.
- **Static Pressure –** One static pressure measurement will be conducted during each test run by rotating the pitot tubes perpendicular to the direction of flow, disconnecting the negative pitot (if positive) and recording the deflection of the manometer.

- **Barometric Pressure -** The barometric pressure will be determined on-site using an aneroid barometer that will be previously calibrated at Eastmount's laboratory using a NIST traceable mercury barometer.

3.4.2 Moisture Determination

Moisture will be measured using the Wet Bulb / Dry Bulb technique. A “dry bulb” temperature will be taken during each flow determination to determine the average duct temperature. Secondly, a “wet bulb” temperature will be taken by placing a thermocouple, wrapped in a damp cloth, into the centroidal area of the stack. Once the temperature has stabilized, a “wet bulb” temperature will be taken. From there, a psychometric calculation program will be used to determine the relative humidity of the gas stream. Once this is determined, moisture (%) will be established for the gas stream by multiplying the saturation moisture value by the relative humidity / 100..

4.0 QUALITY ASSURANCE/QUALITY CONTROL

4.1 Overview

Sampling will be conducted by trained personnel with extensive experience in Reference Method sampling. All sampling and analysis will be conducted in strict accordance with EPA test procedures. The quality control procedures found in the EPA Quality Assurance Handbook for Air Pollution Measurement Systems will be adhered to as well.

All calculations will be conducted in strict accordance with the equations found in the individual Methods. Strict QA/QC protocols will be followed during all phases of this project. These protocols include:

- QA objectives for measurement data;
- Data reduction;
- Internal QC;
- Calibration of equipment;
- Corrective action, if necessary; and
- Use of standardized field data sheets.

These specific procedures in addition to Eastmount's usual high standard of quality control will help validate the results obtained in this test program. As the majority of our emissions testing work is done for compliance purposes, strict QC procedures are incorporated into our everyday work performance.

4.2 Volatile Organic Compounds

The following subsections present the CEMS criteria for VOC that will be adhered to throughout the conduct of the test program.

4.2.1 Leak Check

Prior to the initiation of testing, the reference method VOC system will be leak checked from the end of the sampling probe by ensuring that the system vacuum reached the capacity of the sampling pump (~20"Hg) while all rotameters indicate no flow. If a leak is detected, it will be traced, fixed and the leak check procedure will be repeated until successful.

4.2.2 System Response Time

Prior to the initiation of sampling, a reference method VOC system response time will be determined. During the test program, the system will be allowed to sample a minimum of 2.0 times the response time prior to the initiation of any sampling runs.

4.2.3 Calibration Gases

All calibration gases utilized will be prepared according to EPA Protocol standards. .

4.2.4 Calibration Criteria

- **Calibration Error** – At the beginning of each test day, or as necessary, a calibration error test will be conducted for each analyzer channel for the low and mid level gases, as follows. Following instrument calibration (zero and span), the mid and low range calibration gases will be injected and the instrument responses recorded. From these values calibration error will be calculated for low and mid level gases in accordance with the formula presented below. The maximum allowable calibration error is 5% of the expected value for both the low and mid level gases. If this limit is not achieved, corrective action will be taken and the procedure will be repeated until successful**.**

$$CalibrationError = \frac{(Concentration_{\mathrm{Re}\,sponse} - Concentration_{value})}{InstrumentSpan} \times 100$$

- **Calibration Drift** – Following the initial valid calibration error check and following each subsequent test run, a calibration drift test will be conducted using the zero and a mid level gas for each analyzer channel. As such, following each of the test runs, the zero and mid level calibration gases will be injected and the instrument responses recorded. From these values, calibration drift will be calculated in accordance with the formula presented below. The maximum allowable calibration drift is 3% of instrument span. If this limit is not achieved, the data will be considered invalid, corrective action will be taken and calibration procedures will be repeated until successful.

$$Drift = \left| CalibrationError_{final} - CalibrationError_{iniital} \right| \times 100$$

4.3 Volumetric Flow Equipment Calibrations

Eastmount's pitot tubes and thermocouples are maintained in accordance with specifications set forth in EPA "Quality Assurance Handbook for Air Pollution Measurement Systems - Volume III Stationary Source Specific Methods" and with manufacturer's suggested procedures. A summary is presented below:

- **Thermocouples** - All type K thermocouples are calibrated against ASTM mercury in glass thermometers at three points. The first point is in an ice bath and the second in ambient air and the third in boiling water.

- **Pitot Tubes** - All Type "S" stainless steel pitot tubes are designed to meet the dimensional criteria set forth in Method 2, therefore a coefficient of 0.84 (Type "S") is used. Standard pitot tubes do not require calibration. They are assigned a pitot coefficient of 0.99.

- **Pressure Transducers** – All pressure transducers used in this program will be calibrated against an inclined manometer at three pressure points.

5.0 PLANT ENTRY AND SAFETY

5.1 Safety Responsibilities

Global is responsible for ensuring compliance with plant entry, health, and safety requirements. Mr. Bruce Yates - Terminal Manager, or another appointed person at the facility has the authority to impose or waive facility restrictions. The Eastmount project director has the authority to coordinate with facility person any deviations from the facility restrictions.

In accordance with 40 CFR 60, Section 60.8, the client will make provisions to provide safe access to the sampling location. This includes (but is not limited to) proper staging equipped with OSHA approved safety railing, foot guards and ladder (with provisions to accommodate fall protection as required).

5.2 Safety Program

Eastmount Environmental has a comprehensive health and safety program that satisfies Federal OSHA requirements. The basic elements include: (1) written policies and procedures, (2) routine training of employees and supervisors, (3) medical monitoring, (4) use of personal protection equipment, (5) hazard communication, (6) pre-test meetings with facility personnel and the Eastmount test team personnel, and (7) routine surveillance of the on-going test work.

5.3 Safety Requirements

All test personnel will adhere to the following standard safety and precautionary measures as follows:

- Confine selves to test area only.
- Wear fall protection while ascending ladders, hauling equipment, and working in areas that do not provide adequate safety railings and foot guards
- Wear hard hats at all times on-site, except inside sample recovery trailers and mobile CEM laboratory
- Wear protective shoes or boots in test area.
- Wear protective glasses or goggles in test area.
- Have readily available first aid equipment and fire extinguishers.

On the first day on-site, the project director will post the completed On-site Emergency Response Procedures form (see following page) in the field laboratory.

On-Site Emergency Response Procedures

Project: ____________Date: _____________

Location: _____________________________________ By: _______

1. Evacuation Signal: ___________________________

2. When it sounds: ______________________________

3. Gather with other test personnel at (location):___________________

4. All clear signal: _________________________________

- First aid station location and phone number: ______________________________

- Police phone number: ____

- Fire Department phone number: _________________________________

- Hospital phone number: ____

*** Post or secure at your work station for easy reference in the event of an emergency**

APPENDIX A

EPA 114 Letter (dated 11-02-2011)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

NOV 0 2 2011

Note: Timing Protocols Circled!

CERTIFIED MAIL
RETURN RECEPIT REQUESTED

Eric Slifka, President and CEO
Global Partners, LP
800 South Street, Suite 200
P.O. Box 9161
Wareham, MA 02454-9161

URGENT LEGAL MATTER
REQUIRES PROMPT RESPONSE

Re: Reporting Requirement and Testing Order for Information under Section 114 of the Clean Air Act, 42 U.S.C. § 7414(a)

Dear Mr. Slifka:

This reporting requirement and testing order is part of an EPA investigation to determine whether Global Partners, LP (Global) has violated sections of the Clean Air Act (Act), 42 U.S.C. § 7401 et seq., at its terminal locations in New England.

EPA issues this reporting requirement and testing order pursuant to Section 114 of the Act, 42 U.S.C. § 7414. Under Section 114, EPA may require any person who is subject to any requirement of the Act to: establish records; make reports; sample emissions at the location and in the manner prescribed by EPA; and provide other information that EPA requires.

Reporting Requirement

Pursuant to this authority, EPA directs you to provide the following information within 60 days of receipt of this letter.

1. Provide the following information about Global:
    a. Describe the ownership and business structure;
    b. Indicate the date and state of incorporation;
    c. List any partners or corporate officers;
    d. List any parent and subsidiary corporations;
    e. Provide the net worth of the company.

2. For each Global facility located in New England that purchases, stores, or distributes petroleum products, other than retail gasoline or diesel outlets:
    a. Identify the types of fuels or petroleum products that are stored at each facility;
    b. Provide a facility map, drawing, or schematic that identifies each tank and the type of material stored;

c. Provide a facility map, drawing, or schematic that identifies the location of any barge or truck loading systems.

3. Identify the Global facilities located in New England that are currently capable of storing and/or distributing residual fuel oil (#6 oil) and/or asphalt products. For each facility that currently is capable of storing and/or distributing residual fuel oil (#6 oil) and/or asphalt products:
    a. Provide the number of #6 oil and the number of asphalt storage tanks located at each facility and the storage capacity (in gallons and barrels) of each tank;
    b. Provide the date that each #6 oil and asphalt tank became operational;
    c. Provide the total annual throughput of # 6 oil and the total annual throughput of asphalt products for each facility from 2006 to 2010 (in gallons and barrels);
    d. Describe how #6 oil and asphalt products are delivered to each Global facility (e.g. by truck, rail and/or vessel). Provide the type and quantity of material delivered by truck, rail and/or vessel per year since January 1, 2006.
    e. Provide the name of the originating refinery used for each shipment of #6 oil or asphalt received at the facility since January 1, 2006;
    f. Describe how #6 oil and asphalt products are shipped offsite (by truck, rail and/or vessel). Provide the type and quantity of material shipped by truck, rail and/or vessel per year since January 1, 2006.

The following questions, numbered 4 through 11 relate to any facility owned or operated by Global (not limited to New England facilities):

4. Provide the test results or analysis of any air emissions testing from #6 oil and/or asphalt storage tank vents or "head space" above the oil or asphalt.

5. Provide the test results or analysis of any air emissions testing of volatile organic compounds ("VOC") and/or hazardous air pollutants ("HAP") from #6 oil and asphalt vessel loading and truck loading operations.

6. Provide any calculations used to estimate annual or short term VOC and/or HAP emissions from #6 oil and asphalt at any facility, including loading and unloading operations, storage tanks, material transfer (e.g., piping, pumps, etc.), wastewater, stormwater collection systems, or any other equipment used to handle #6 oil or asphalt at the facility. <u>Do not</u> include calculations that use AP-42 emission factors for #6 oil or asphalt.

7. Provide copies of all correspondence Gulf has had with state and federal environmental agencies regarding VOC and/or HAP emissions from #6 oil and asphalt storage, transfer, or distribution, including copies of:
    a. All permits issued;
    b. All permit applications;

c. All emission statements; and
d. Any requests for permit modifications.

8. For Global customers located in New England that have purchased one million gallons or more per year of #6 oil or asphalt since January 1, 2006, provide the customer name, facility address, and quantity of #6 oil and asphalt purchased each year from 2006 to 2010.

9. Provide all information in Global's possession which identifies and/or describes any changes in the formulation of #6 oil and/or asphalt.

Testing Order

This Testing Order requires Global to monitor and sample the headspace of tanks containing #6 oil and asphalt for VOC and HAP content, and to monitor and sample related loading operations, at Global locations in New England.

1. Within fourteen days of receipt of this Testing Order, contact EPA's Bill Osbahr at (617) 918-8389 to discuss the pre-test protocol and the scheduling of a pre-test conference.

2. Within 60 days of receipt of this Testing Order, prepare and mail to EPA and the appropriate state environmental agency a pre-test protocol for performing headspace monitoring and a sample analysis program for tanks and loading operations of residual oil (#6 oil) and asphalt. Global shall follow the sampling and test methods specified in the Testing Order. Or, if desired, Global may propose a different sampling or test method and submit to EPA for approval in writing with the pre-test protocol. Note, if a different method is proposed, EPA may require additional information.

3. Within 90 days of receipt of this Testing Order, Global shall revise and resubmit the test protocol in accordance with any written EPA comments or required changes. EPA shall approve, approve with conditions, or disapprove Global's test protocol in writing. Global's tank selection will be subject to EPA's review and approval as part of this process.

4. Global shall select at least one #6 oil tank and at least one asphalt tank to be tested. Each tank selected for testing must be located in New England and must be an active tank. An active tank is a tank that contains product, is heated, is connected to a truck loading rack, and is in service. Each tank selection shall be submitted to EPA in writing with the pre-test protocol for EPA's review and approval. For purposes of this testing order, Global shall not select tanks located at the facility in Chelsea, Massachusetts.

5. No later than March 31, 2012, Global shall monitor and analyze tank headspace and loading operations for VOC and HAP emissions for #6 oil as described in paragraphs 7 and 8 below.

6. No later than May 31, 2012, Global shall monitor and analyze tank headspace and loading operations for VOC and HAP emissions for asphalt as described in paragraphs 7 and 8 below.

7. Specifically, for #6 oil and asphalt headspace monitoring, Global shall continuously monitor VOC emissions from each tank vent using Reference Method 25a under 40 C.F.R. Part 60, Appendix A. Note that depending on the tank vent configuration, a temporary total enclosure consistent with EPA Method 204 may need to be established prior to monitoring. Global shall install a continuous vapor emissions monitor at the tank vent to monitor and record vapor concentrations from the tanks.

    a. At a minimum, Global shall install the continuous monitor and commence monitoring 24 hours before a scheduled tank filling and monitoring shall continue during and after the tank filling process. The continuous monitoring shall continue for at least 30 days. Global shall continuously monitor and record the tanks' vapor concentrations in units of parts per million as methane on a volumetric basis ("ppmv"), and provide EPA with the recorded concentration results as provided below. Global shall also monitor air flow and provide results to EPA. Based on the monitoring data, Global shall calculate a VOC emissions rate in pounds per hour.
    b. Following each tank filling or delivery event that occurs during the 30 days of monitoring, Global shall collect a product sample and analyze for vapor pressure using ASTM Method D2879 as well as ASTM D323-82 or 94. Each sample shall follow proper chain of custody procedures and the following information shall be noted:
        i. Date and time of sample collection;
        ii. Temperature of sample at time of collection;
        iii. Location of sample collection (facility name and tank identification);
        iv. A description of any deviations from sampling or analysis techniques described in the protocol;
        v. Identify the date, supplier's name, and originating refinery of each batch of #6 oil or asphalt that is sampled by the facility.
    c. At least once per day during the 30 days of testing Global shall record the temperature of the product(#6 oil and asphalt) in each tank.
    d. At least once per day during the 30 days of testing Global shall record the quantity of product (in gallons and percent capacity) stored in each tank.

8. Global shall also analyze for HAP content in the emissions from each tank headspace using EPA Method TO-15. Global shall determine HAP emissions for each tank that is tested. Based on the monitoring data, Global shall calculate a HAP emissions rate in pounds per hour. For purposes of this calculation, Global shall calculate HAP emissions from the single largest HAP present as well as the total HAP present in the TO-15 sample.

9. During the 30 days that VOC emissions are monitored from each tank, Global must also monitor VOC emissions from truck and/or rail loading operations. Based on the monitoring data, Global shall calculate a VOC emissions rate in units of pounds per hour as well as in units of pounds VOC emitted per gallon of oil/asphalt loaded.

10. Using the TO-15 emissions data collected on the tanks, Global shall calculate HAP emissions from truck and/or rail loading operations. Global may, if desired, and if it is technically feasible, collect and analyze additional TO-15 samples from the truck and/or rail loading operations for the purposes of calculating HAP emissions from truck and/or rail loading operations. Global shall calculate a HAP emissions rate in units of pounds per hour as well as in units of pounds HAP emitted per gallon of oil/asphalt loaded. For purposes of this calculation, Global shall calculate HAP emissions from the single largest HAP present as well as the total HAP present in the TO-15 sample.

11. Within 30 days of completing the testing, submit a complete test report to EPA and the appropriate state environmental agency. Included with the test report, Global shall also submit:

    a. A description of any maintenance (or other repairs or changes) done on the tanks, loading racks, and/or any vapor collection and processing system between the date of receipt of this letter and the EPA-observed emissions test date, including a description of the reason(s) for such maintenance; and
    b. The data and results from any pre-test sampling and/or engineering studies Global elects to conduct on the tanks, loading racks, and/or any vapor collection and processing system between the date of receipt of this letter and the EPA-observed emissions test date, and any memos or reports that summarize the results of the same.
    c. The formulas used as well as sample calculations to demonstrate how Global calculated emissions for the purposes of this Testing Order.

Attachment A to this Testing Order provides lists of guidelines for pre-test protocols and post-test final reports. In specific circumstances, EPA may request additional information.

Submissions required by this letter shall be mailed to all of the following:

Elizabeth A. Kudarauskas US EPA Region I 5 Post Office Square, Suite 100 Mail Code: OES-04-2 Boston, Massachusetts 02109-3912	William Osbahr US EPA Region I Mail Code EIA 11 Technology Drive North Chelmsford, MA 01863-2431

Be aware that if Global does not provide all the information required under the Testing Order in a timely manner, fails to timely submit a test protocol in accordance with EPA's requirements, fails to conduct the required emissions test in a timely manner, or fails to submit a timely and complete test report, EPA may order it to comply and may assess monetary penalties under Section 113 of the Act, 42 U.S.C. § 7413. Note that federal law also establishes criminal penalties for providing false information to EPA. This letter is not subject to Office of Management and Budget review pursuant to the Paperwork Reduction Act, 44 U.S.C. Chapter 35.

You may assert a business confidentiality claim covering part or all of the information requested, in the manner described by 40 CFR § 2.203(b). Information covered by such a claim will be disclosed by EPA only to the extent, and by means of the procedures, set forth in 40 CFR Part 2, Subpart B. Note that certain categories of information, such as emission data, are not properly the subject of such a claim. If no such claim accompanies the information when EPA receives it, EPA may make the information available to the public without further notice to you. Please be aware that states may have different rules and regulations governing the protection of confidential business information.

If you have any questions regarding this Testing Order, please contact Environmental Engineer Elizabeth Kudarauskas, at (617) 918-1564, or have your attorney call Senior Enforcement Counsel Thomas Olivier at (617) 918-1737.

Sincerely,

Sam Silverman, acting for

Susan Studlien, Director
Office of Environmental Stewardship

Enclosure

cc: Robert Girard, CT DEEP
Ted Burns, RI DEM
Kurt Tidd, ME DEP

Ed Pawlowski, MA DEP Northeast Regional Office
Saadi Motamedi, MA DEP Western Regional Office
Gregg Hunt, MA DEP Southeast Regional Office
John Kronopolus, MA DEP Central Regional Office
Christian Jones, VT DEC
Pamela Monroe, NH DES

REQUIREMENTS FOR AIR EMISSIONS TESTING

A. PRETEST INFORMATION REQUIREMENTS

In order to establish uniform requirements and help ensure that proper test methods and procedures are utilized, the information specified below must be submitted to EPA Region 1 in the form of a test protocol. EPA will notify the company of any deficiencies or required changes in the test protocol. Following such notification, the company shall revise and resubmit the test protocol for EPA review and approval.

Except as otherwise provided by EPA, the test protocol shall provide for testing in strict accordance with applicable procedures in 40 C.F.R. Part 60, Appendix A, Standards of Performance for New Stationary Sources, or in 40 C.F.R. Part 61, Appendix B, National Emission Standards for Hazardous Air Pollutants. Any variations in sampling or analytical procedures must be indicated in the test protocol and receive written approval from EPA prior to testing.

The test protocol shall provide the following information, at a minimum:

1. Identification and a brief description of the source to be tested. The description shall include:

    a. Type of industrial process or combustion facility;

    b. Type and quantity of raw and finished materials used in the process;

    c. Description of any cyclical or batch operations which would tend to produce variable emissions with time;

    d. Basic operating parameters used to regulate the process; and

    e. Rated capacity of the process.

2. A brief description of the air pollution control equipment associated with the process, including:

    a. Type of control device;

    b. Operating parameters;

    c. Rated capacity and efficiency; and

    d. Ultimate disposal of wastes.

3. Type of pollutant to be sampled (particulate matter, NOx, SO_2, hydrocarbons, etc.).

4. A description of the emission sampling equipment, including a schematic diagram of the sampling train.

5. A description of the sampling and analysis procedures. Reference standard methods, if applicable. Indicate any proposed variations and provide justification.

6. A sketch with dimensions indicating the flow of exhaust gases from the process, through the control equipment and associated ductwork to the stack.

7. In accordance with 40 C.F.R. Part 60, Appendix A, Method 1:

    a. An elevation view of the dimensions of the stack configuration indicating the location of the sampling ports and distances to the nearest upstream and downstream flow interferences; and
    b. A cross-sectional sketch of the stack at the sampling location with dimensions indicating the location of the sampling traverse points.

8. Estimated flue gas conditions at sampling location, including temperature, moisture content, and velocity pressure.

9. A description of the process and control equipment operating data to be collected during the sampling period.

10. Copies of the field data sheet forms to be used during the tests.

11. Names and titles of personnel who will be performing the tests.

12. A description of the procedures for maintaining the integrity of the samples collected, including chain of custody and quality control procedures.

13. Calibration sheets for the dry gas meter, orifice meter, pilot tube, and/or any other equipment that requires calibration.

14. A list of pre-weighed filters to be used during particulate emission testing, including identification and tare weights.

(Note: Items 13 and 14 must be submitted prior to actual testing, but need not be included with the pretest information.)

B. EMISSION TEST REPORT REQUIREMENTS

The emission test report must contain all pertinent data concerning the tests, including a description of the process and operating conditions under which the tests were made, the results of the tests, and test procedures. While the exact format of the report will vary depending upon the type and objective of the tests, below is a suggested format containing elements that must be incorporated in the report.

1. Introduction:

    a. Identification, location, and dates of tests;

    b. Purpose of tests;

    c. Brief description of source; and

    d. Name and affiliation of person in charge of tests.

2. Summary of results:

    a. Operating and emission data; and

    b. Comparison with applicable emission regulations.

3. Source description:

    a. Description of process including operation of emission control equipment;

    b. Flow sheet (if applicable);

    c. Type and quantity of raw and finished materials processed during the tests;

    d. Maximum normal rated capacity of the process; and

    e. Description of process instrumentation monitored during the test.

4. Sampling and analytical procedures:

    a. Description of sampling train and field procedures;

    b. Description of recovery and analytical procedures;

    c. Sketch indicating sampling port locations relative to process, control equipment upstream and downstream flow disturbances; and

d. Sketch or cross-sectional view of stack indicating traverse point locations.

5. Test results and discussion:

   a. Detailed tabulation of results including process operating conditions and flue gases conditions;

   b. Discussion of significance of results relative to operating parameters and emission regulations; and

   c. Discussion of any divergences from normal sampling procedures or operating conditions that could have affected the test results.

6. Calculation and data reduction methods:

   a. Description of computational methods, including the equation format used to obtain final emissions results from field data; and

   b. Sample calculations from at least one run of each type of test performed.

7. Appendix

   a. Copies of all field data collected during the test, including sampling data sheets and process operating logs;

   b. Copies of all analytical laboratory data;

   c. Calculation sheets or computer input and output data;

   d. Sampling equipment and laboratory calibration data;

   e. Names and titles of personnel and organizations participating in the tests;

   f. Visible emission observations performed during the tests (if required); and

   g. Copies of all chain of custody information.

APPENDIX B

Sample Emission Calculations, Field Data Sheets, and Equipment Calibrations

Method 25A Calibration Data Sheet - Total Hydrocarbons

Source Summary	
Facility / Site:	
Source/ Location:	
Test Date:	

Field Crew Summary
Crew Member 1 -
Crew Member 2 -
Crew Member 3 -

THC Analyzer Data			
Manufacturer -		VIG	
Model/Serial Number -		200	
Fuel Pressure -		6	
Combustion Air Pressure -		6	
Sample Pressure -		1.5	
Range -	0	-	10,000
Calibrant (choose one, x in box)		Propane	
		Methane	X
Program Molecular Weight:		16.04	g/mol

Run Summary			
Run No.	1	2	3
Start Time			
Stop Time			

Calibration Error Test Data

Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas	0.0	0.0
High Gas	8240	8255
Response Line	1.002	

Response Line = (Ha-Za)/(Hc-Zc)

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Acceptance Criteria
Low Gas	3050	3056	3078	0.7	< 5% of cylinder concentration
Mid Gas	4970	4979	5010	0.6	< 5% of cylinder concentration

Where:

Predicted Response = (Cylinder Concentration) x (Response Line)

Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Calibration Drift Test Data

Calibration Gas	Cylinder Concentration	Initial Test Response	Final Test Response	Calibration Drift	Acceptance Criteria	
Test Run 1 Zero	0.0	0.0	0.8	0.0	< 3% of the measurement range	
Test Run 1 Mid	3050	3078	3092	0.1	< 3% of the measurement range	
					Test Run 1 Avg. Conc.	2,890
Test Run 2 Zero	0.0	0.0	0.3	0.0	< 3% of the measurement range	
Test Run 2 Mid	3050	3078	3098	0.2	< 3% of the measurement range	
					Test Run 2 Avg. Conc.	2,766
Test Run 3 Zero	0.0	0.3	0.1	0.0	< 3% of the measurement range	
Test Run 3 Mid	3050	3078	3096	0.2	< 3% of the measurement range	
					Test Run 3 Avg. Conc.	2,893

Where:

$$\text{Calibration Drift} = \frac{\text{(Final Test Response - Initial Test Response)}}{\text{Measurement Range}} * 100$$

Gas Cylinder Data

Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel	N/A		UHP H2	N/A	N/A	N/A
Combustion Air			UHP Air	N/A	N/A	
Zero Gas	0	0	UHP Air	N/A	N/A	0.0%
Low Gas	25-35	3,050.0	CH4/Air			30.5%
Mid Gas	45-55	4,970.0	CH4/Air			49.7%
High Gas	80-90	8,240.0	CH4/Air			82.4%

CEMS System Response Time = 60 seconds

Method 18 Calibration Data Sheet - Methane

Source Summary	
Facility / Site:	
Source/ Location:	
Test Date:	

Field Crew Summary
Crew Member 1 -
Crew Member 2 -
Crew Member 3/4

THC Analyzer Data			
Manufacturer -		VIG	
Model/Serial Number -		200	
Fuel Pressure -		6	
Combustion Air Pressure -		6	
Sample Pressure -		1.5	
Range -	0	-	100
Calibrant (choose one, x in box)		Propane	
		Methane	x
Program Molecular Weight:		16.04	g/mol

Run Summary			
Run No.	1	2	3
Start Time			
Stop Time			

Calibration Error Test Data		
Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas	0.0	0.0
High Gas	87.3	87.2
Response Line	0.999	

Response Line = (Ha-Za)/(Hc-Zc)

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Acceptance Criteria
Low Gas	31.0	31.0	30.8	0.5	< 5% of cylinder concentration
Mid Gas	51.7	51.6	51.6	0.1	< 5% of cylinder concentration

Where:

Predicted Response = (Cylinder Concentration) x (Response Line)

Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Calibration Drift Test Data

Calibration Gas	Cylinder Concentration	Initial Test Response	Final Test Response	Calibration Drift	Acceptance Criteria	
Test Run 1 Zero	0.0	0.0	0.3	0.3	< 3% of the measurement range	
Test Run 1 Mid	31.0	30.8	30.8	0.0	< 3% of the measurement range	
					Test Run 1 Avg. Conc.	1.82
Test Run 2 Zero	0.0	0.0	0.1	0.1		
Test Run 2 Mid	31.0	30.8	30.7	0.1		
					Test Run 2 Avg. Conc.	3.12
Test Run 3 Zero	0.0	0.0	0.0	0.0	< 3% of the measurement range	
Test Run 3 Mid	31.0	30.8	30.5	0.3	< 3% of the measurement range	
					Test Run 3 Avg. Conc.	4.04

Where:

$$\text{Calibration Drift} = \frac{\text{Final Test Response} - \text{Initial Test Response}}{\text{Measurement Range}} * 100$$

Gas Cylinder Data

Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel	N/A		UHP H2	N/A	N/A	N/A
Combustion Air			UHP Air	N/A	N/A	
Zero Gas	0	0	UHP Air	N/A	N/A	0.0%
Low Gas	25-35	31.0	CH4/Air			31.0%
Mid Gas	45-55	51.7	CH4/Air			51.7%
High Gas	80-90	87.3	CH4/Air			87.3%

CEMS System Response Time = 60 seconds

VOLUMETRIC FLOW CALCULATIONS

Facility / Site:	**Run No.:**
Source:	**Date:**

Trav. Point	Delta P	SQ Root Delta P	Stack Temp
A1	0.002	0.04	130
2	0.002	0.04	130
3	0.002	0.04	130
4	0.002	0.04	130
5	0.002	0.04	130
6	0.002	0.04	130
7	0.002	0.04	130
8	0.002	0.04	130
B1	0.002	0.04	130
2	0.002	0.04	130
3	0.002	0.04	130
4	0.002	0.04	130
5	0.002	0.04	130
6	0.002	0.04	130
7	0.002	0.04	130
8	0.002	0.04	130
Average	**0.00**	**0.04**	**130.0**

Average Delta P	**0.00**
Average Stack Temp	**130.0**
Bwo	**0.075**
Barometric Press	**29.95**
P Static	**-0.33**
% CO2	**0.00**
% O2	**20.90**
% CO	**0**
% N2	**79.1**
Stack Dia (ft)	**0.33**
L	
W	
Stack Area	**0.087**
Cp	**0.99**
Md	**28.84**
Ms	**28.02**

G	**0.84**	
VS	**3.17**	**FPS**
Qs	**825**	**DSCFH**
	892	**WSCFH**
	15	**WSCFM**
	14	**DSCFM**
	17	**ACFM**

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

Emission Rate Calculation Sheet - THC

Facility / Site:		**Run No.:**	
Source:		**Date:**	

START TIME :	0:00	END TIME :	0:00

AVERAGE CONCENTRATION	**2,890.0**	PPM
AVERAGE FLOW RATE	15	WSCFM
MOLECULAR WEIGHT (Methane)	16.04	g/mole

mg/m3 =	(MW * PPM) / (24.055 l/mol. PPM) =		**1926.95**	mg/m3
mg/SCF =	(mg/m3) (m3/35.31 SCF)	=	**54.57**	mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**0.0001203**	lb/SCF
lb/hr =	(lb/SCF * WSCFM * 60 min/hr)	=	**0.11**	lb/hr

Emission Rate Calculation Sheet - Methane

Facility / Site:	**Run No.:**
Source:	**Date:**

START TIME :		END TIME :	

AVERAGE CONCENTRATION	**1.82**	PPM
AVERAGE FLOW RATE	15	WSCFM
MOLECULAR WEIGHT (methane)	16.04	g/mole

mg/m3 =	(MW * PPM) / (24.055 l/mol. PPM) =		**1.21**	mg/m3
mg/SCF =	(mg/m3) (m3/35.31 SCF)	=	**0.03**	mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**7.577E-08**	lb/SCF
lb/hr =	(lb/SCF * WSCFM * 60 min/hr)	=	**0.00**	lb/hr

VOC HAP Emission Summary								
Compound (Page 1 of 2)	T015-R1 SUMMA #7865		T015-R2 SUMMA #T2493		T015-R3 SUMMA #7858		Average	
Date								
Start								
Stop								
	ug/M3	lb/hr	ug/M3	lb/hr	ug/M3	lb/hr	ug/M3	lb/hr
Propioaldehyde	< 24	1.24E-06	< 47	2.43E-06	21	1.09E-06	31	1.59E-06
2,2,4-Trimethylpentane	< 5.98	3.10E-07	< 5.7	2.95E-07	< 0.934	4.84E-08	< 4.20	2.18E-07
Carbon Disulfide	15.2	7.87E-07	12.7	6.58E-07	3.84	1.99E-07	10.6	5.48E-07
Propene	< 3.3	1.71E-07	< 3.15	1.63E-07	458	2.37E-05	154.8	8.02E-06
Vinyl Acetate	< 4.51	2.34E-07	< 4.3	2.23E-07	< 0.704	3.65E-08	< 3.17	1.64E-07
Vinyl Bromide	< 5.6	2.90E-07	< 5.34	2.77E-07	< 0.875	4.53E-08	< 3.94	2.04E-07
Dichlorodifluoromethane	< 6.33	3.28E-07	< 6.03	3.12E-07	< 0.989	5.12E-08	< 4.45	2.30E-07
1,2-Dichlorotetrafluoroethane	< 7.61	3.94E-07	< 7.25	3.76E-07	< 1.19	6.16E-08	< 5.35	2.77E-07
Chloromethane	< 3.96	2.05E-07	< 3.78	1.96E-07	< 0.62	3.21E-08	< 2.79	1.44E-07
Vinyl Chloride	< 2.94	1.52E-07	< 2.81	1.46E-07	< 0.46	2.38E-08	< 2.07	1.07E-07
Chloroethane	< 5.07	2.63E-07	< 4.83	2.50E-07	< 0.792	4.10E-08	< 3.56	1.85E-07
1,3-Butadiene	< 7.08	3.67E-07	< 6.75	3.50E-07	< 1.11	5.75E-08	< 4.98	2.58E-07
Trichlorofluoromethane	< 7.19	3.72E-07	< 6.85	3.55E-07	< 1.12	5.80E-08	< 5.05	2.62E-07
Trichlorotrifluoroethane	< 7.36	3.81E-07	< 7.01	3.63E-07	< 1.15	5.96E-08	< 5.17	2.68E-07
Ethanol	< 27.7	1.43E-06	< 26.4	1.37E-06	< 4.33	2.24E-07	< 19.48	1.01E-06
2-propanol	< 47.2	2.44E-06	< 45	2.33E-06	< 7.37	3.82E-07	< 33.19	1.72E-06
2-Propanone	217	1.12E-05	244	1.26E-05	94.0	4.87E-06	185.00	9.58E-06
Methyl Ethyl Ketone (2-Butanone)	< 56.6	2.93E-06	< 54	2.80E-06	12.2	6.32E-07	40.93	2.12E-06
Methyl Isobutyl Ketone	< 83.9	4.35E-06	< 80	4.14E-06	< 13.1	6.79E-07	< 59.00	3.06E-06
Methyl Butyl Ketone (2-Hexanone)	< 52.4	2.71E-06	< 50	2.59E-06	< 8.19	4.24E-07	< 36.86	1.91E-06
Methyl t-butyl ether (MTBE)	< 4.61	2.39E-07	< 4.4	2.28E-07	< 0.721	3.73E-08	< 3.24	1.68E-07
Ethyl Acetate	< 50.7	2.63E-06	< 48.4	2.51E-06	< 7.93	4.11E-07	< 35.68	1.85E-06
1,1-Dichloroethylene	< 6.34	3.28E-07	< 6.05	3.13E-07	< 0.991	5.13E-08	< 4.46	2.31E-07
cis-1,2-Dichloroethylene	< 4.82	2.50E-07	< 4.6	2.38E-07	< 0.753	3.90E-08	< 3.39	1.76E-07
trans-1,2-Dichloroethylene	< 5.07	2.63E-07	< 4.84	2.51E-07	< 0.793	4.11E-08	< 3.57	1.85E-07
Methylene Chloride	< 17.8	9.22E-07	< 17	8.81E-07	< 2.78	1.44E-07	< 12.53	6.49E-07
Chloroform	< 4.69	2.43E-07	< 4.47	2.32E-07	< 0.732	3.79E-08	< 3.30	1.71E-07
Carbon Tetrachloride	< 12.1	6.27E-07	< 11.5	5.96E-07	< 1.89	9.79E-08	< 8.50	4.40E-07
1,1-Dichloroethane	< 5.18	2.68E-07	< 4.94	2.56E-07	< 0.809	4.19E-08	< 3.64	1.89E-07
1,2-Dichloroethane	< 5.18	2.68E-07	< 4.94	2.56E-07	< 0.809	4.19E-08	< 3.64	1.89E-07
Ethylene Dibromide	< 8.36	4.33E-07	< 7.97	4.13E-07	< 1.31	6.79E-08	< 5.88	3.05E-07
1,1,1-Trichloroethane	< 10.5	5.44E-07	< 9.98	5.17E-07	< 1.64	8.49E-08	< 7.37	3.82E-07
1,1,2-Trichloroethane	< 5.24	2.71E-07	< 4.99	2.58E-07	< 0.818	4.24E-08	< 3.68	1.91E-07
1,1,2,2-Tetrachloroethane	< 8.79	4.55E-07	< 8.38	4.34E-07	< 1.37	7.10E-08	< 6.18	3.20E-07
cis-1,3-Dichloropropene	< 5.23	2.71E-07	< 4.98	2.58E-07	< 0.817	4.23E-08	< 3.68	1.90E-07
trans-1,3-Dichloropropene	< 4.94	2.56E-07	< 4.71	2.44E-07	< 0.772	4.00E-08	< 3.47	1.80E-07
Volumetric Flow (dscfh)	828		828		828		828	

VOC HAP Emission Summary												
Compound (Page 2 of 2)	T015-B20-R1 SUMMA #7865			T015-B20-R2 SUMMA #T2493			T015-B20-R3 SUMMA #7858			Average		
Date												
Start												
Stop												
		ug/M3	lb/hr		ug/M3	lb/hr		ug/M3	lb/hr		ug/M3	lb/hr
1,2-Dichloropropane	<	11.8	6.11E-07	<	11.3	5.85E-07	<	1.85	9.58E-08	<	8.32	4.31E-07
Bromomethane	<	4.47	2.32E-07	<	4.26	2.21E-07	<	0.699	3.62E-08	<	3.14	1.63E-07
Bromoform	<	13.2	6.84E-07	<	12.6	6.53E-07	<	2.07	1.07E-07	<	9.29	4.81E-07
Bromodichloromethane	<	8.58	4.44E-07	<	8.17	4.23E-07	<	1.34	6.94E-08	<	6.03	3.12E-07
Dibromochloromethane	<	10.9	5.65E-07	<	10.4	5.39E-07	<	1.7	8.81E-08	<	7.67	3.97E-07
Heptane	<	7.87	4.08E-07	<	7.5	3.88E-07	<	1.23	6.37E-08	<	5.53	2.87E-07
Trichloroethylene	<	10.3	5.34E-07	<	9.83	5.09E-07	<	1.61	8.34E-08	<	7.25	3.75E-07
Tetrachloroethylene	<	8.68	4.50E-07		9.47	4.91E-07	<	1.36	7.04E-08		6.50	3.37E-07
Benzene		4.01	2.08E-07		4.68	2.42E-07		242	1.25E-05		83.56	4.33E-06
Toluene		6.46	3.35E-07		21.6	1.12E-06		75.8	3.93E-06		34.62	1.79E-06
Ethylbenzene	<	5.56	2.88E-07	<	5.3	2.75E-07		7.23	3.75E-07		6.03	3.12E-07
p+m-Xylene	<	10.3	5.34E-07	<	9.8	5.08E-07		13.6	7.04E-07		11.23	5.82E-07
o-Xylene	<	5.56	2.88E-07	<	5.3	2.75E-07		5.83	3.02E-07		5.56	2.88E-07
Styrene	<	5.45	2.82E-07	<	5.2	2.69E-07	<	0.852	4.41E-08	<	3.83	1.99E-07
1,3,5-Trimethylbenzene	<	15.7	8.13E-07	<	15	7.77E-07	<	2.46	1.27E-07	<	11.05	5.73E-07
1,2,4-Trimethylbenzene	<	15.7	8.13E-07	<	15	7.77E-07		3.79	1.96E-07		11.50	5.96E-07
4-ethyltoluene	<	69.2	3.58E-06	<	66	3.42E-06	<	10.8	5.59E-07	<	48.67	2.52E-06
Chlorobenzene	<	5.89	3.05E-07	<	5.62	2.91E-07	<	0.921	4.77E-08	<	4.14	2.15E-07
Benzyl chloride	<	33.1	1.71E-06	<	31.6	1.64E-06	<	5.18	2.68E-07	<	23.29	1.21E-06
1,3-Dichlorobenzene	<	15.4	7.98E-07	<	14.7	7.61E-07	<	2.4	1.24E-07	<	10.83	5.61E-07
1,4-Dichlorobenzene	<	15.4	7.98E-07	<	14.7	7.61E-07	<	2.4	1.24E-07	<	10.83	5.61E-07
1,2-Dichlorobenzene	<	15.4	7.98E-07	<	14.7	7.61E-07	<	2.4	1.24E-07	<	10.83	5.61E-07
1,2,4-Trichlorobenzene	<	95	4.92E-06	<	90.5	4.69E-06	<	14.8	7.67E-07	<	66.77	3.46E-06
Hexachlorobutadiene	<	205	1.06E-05	<	195	1.01E-05	<	32	1.66E-06	<	144.0	7.46E-06
Hexane	<	6.77	3.51E-07	<	6.45	3.34E-07	<	1.06	5.49E-08	<	4.76	2.47E-07
Cyclohexane	<	4.41	2.28E-07	<	4.2	2.18E-07	<	0.688	3.56E-08	<	3.10	1.61E-07
Tetrahydrofuran	<	7.55	3.91E-07	<	7.2	3.73E-07	<	1.18	6.11E-08	<	5.31	2.75E-07
1,4-Dioxane	<	46.1	2.39E-06	<	44	2.28E-06	<	7.21	3.73E-07	<	32.44	1.68E-06
Xylene (Total)	<	16.7	8.65E-07	<	15.9	8.24E-07		25.8	1.34E-06		19.47	1.01E-06
Surrogate Recovery (%)												
Bromochloromethane	87			87			112			95		
D5-Chlorobenzene	91			102			104			99		
Difluorobenzene	88			88			112			96		
Volumetric Flow (dscfh)	828			828			828			828		

Method 18 Data Sheet

Client		GC Manufacturer	
Facility		Model/Serial Number	
Source		Fuel Pressure	
Test Location		Combustion Air Pressure	
Date		Sample Pressure	
Testers		Measurement Range	

Calibration Gas Values

Low Gas	
Mid Gas	
High Gas	

Test Data

Test Number	1	2	3
Start Time			
Stop Time			

Pre-Test Calibration

Calibration Gas	Injection 1	Injection 2	Injection 3	3 Injection Average	Criteria Acceptance
Low Gas					< 5% of mean value
Mid Gas					< 5% of mean value
High Gas					< 5% of mean value

Test Data

Calibration Gas	Cylinder Concentration	GC Response	Drift	Test Run Avg. Conc.	Criteria Acceptance
Test Run 1 Zero					< 5% of initial cal value
Test Run 1 Mid					< 5% of initial cal value
Test Run 2 Zero					< 5% of initial cal value
Test Run 2 Mid					< 5% of initial cal value
Test Run 3 Zero					< 5% of initial cal value
Test Run 3 Mid					< 5% of initial cal value

Post-Test Calibration

Calibration Gas	Injection 1	Injection 2	Injection 3	3 Injection Average	Criteria Acceptance
Zero Gas			UHP N2		
Low Gas					< 5% of initial cal value
Mid Gas					< 5% of initial cal value
High Gas					< 5% of initial cal value

Method 25A Data Sheet

Client ______________
Facility ______________
Source ______________
Test Location ______________
Date ______________

THC Analyzer Data

Manufacturer ______________
Model/Serial Number ______________
Fuel Pressure ______________
Combustion Air Pressure ______________
Sample Pressure ______________
Measurement Range ______________
Response Time ______________

Test Data

Test Number	1	2	3
Start Time			
Stop Time			

Testers

Calibration Error Test Data		
Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas		
High Gas		
Response Line		
Response Line = (Ha/Za)/(Hc-Zc)		

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Criteria Acceptance
Low Gas					< 5% of cylinder concentration
Mid Gas					< 5% of cylinder concentration

Predicted Response = (Cylinder Concentration) x (Response Line)
Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Calibration Drift Test Data						
Calibration Gas	Cylinder Concentration	CE Test Response	Actual Response	Calibration Drift	Criteria Acceptance	
Test Run 1 Zero					< 3% of the measurement range	
Test Run 1 Mid					< 3% of the measurement range	
					Test Run 1 Avg. Conc.	
Test Run 2 Zero					< 3% of the measurement range	
Test Run 2 Mid					< 3% of the measurement range	
					Test Run 2 Avg. Conc.	
Test Run 3 Zero					< 3% of the measurement range	
Test Run 3 Mid					< 3% of the measurement range	
Calibration Drift = (Actual Response - CE Test Response) * 100 / Measurement Range					Test Run 3 Avg. Conc.	

Gas Cylinder Data						
Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel			UHP H2			
Combustion Air			UHP Air			
Zero Gas			UHP N2			
Low Gas	25 - 35					
Mid Gas	45 - 55					
High Gas	80 - 90					

EASTMOUNT ENVIRONMENTAL SERVICES

Air Quality Specialists

EPA Method 2 Field Data Sheet

Client:		
Site Location:		
Source:		
Test Location:		
Duct Diameter:		
Test Number:		
Test Time:		
Test Date:		
Testers:		
Pitot Number:		
Pitot Coefficient:		
Ambient Temperature:		
Wet Bulb Temp:		
Barometric Pressure:		
Duct Static Pressure:		
	Pre / Post	
Leak Checks:	/	
Pump Calibration		
	Initial	Final
1		
2		
3		
Impinger Volume		
1		
2		
3		

Port Number	Traverse Point	Velocity Pressure	Stack Temp.

EASTMOUNT ENVIRONMENTAL SERVICES
Air Quality Specialists

Thermocouple Calibration

TC ID:	TC S-5-1	**Cal Date:**	12/6/2010	**Reference Type:**	Mercury in Glass
Tech.:	M. Bruni	**Exp Date:**	12/6/2011	**Reference Cert. No.:**	ASTM-3

Ice Bath (0°C)

	Ref Temp (T_R)	TC Temp (T_T)	% Error
Run 1	33	34	-0.33%
Run 2	33	35	-0.65%
Run 3	33	35	-0.65%

Pass/Fail PASS

Boiling Water (100°C)

	Ref Temp (T_R)	TC Temp (T_T)	% Error
Run 1	212	210	0.41%
Run 2	212	211	0.21%
Run 3	212	210	0.41%

Pass/Fail PASS

Hot Oil (~230°C)

	Ref Temp (T_R)	TC Temp (T_T)	% Error
Run 1	466	465	0.14%
Run 2	466	467	-0.14%
Run 3	466	464	0.27%

Pass/Fail PASS

Test Pass/Fail PASS

Calibration tolerance for each run is 1.5%.

% Error = $(((T_R + 273) - (T_T + 273)) / (T_R + 273)) \cdot 100$

Calibration conducted in accordance with EPA Method 2, Section 10.3.

EASTMOUNT ENVIRONMENTAL SERVICES
Air Quality Specialists

PRESSURE TRANSDUCER CALIBRATION FORM

Calibration Date: 4-Jan-10 Calibrated By: Michael Bruni

Inches of Water	Ref. Manometer - Positive Leg (in. H2O)	Dwyer Series 616 Transducer- P1 (in. H2O)	Difference (in. H2O)
~0.25	0.26	0.25	0.01
~0.50	0.51	0.51	0
~0.75	0.74	0.73	0.01
~1.00	1.10	1.12	0.02
~1.50	1.51	1.5	0.01
~2.00	2.00	1.98	0.02
~2.50	2.55	2.53	0.02
		Average Difference =	0.01

Inches of Water	Ref. Manometer - Negative Leg (in. H2O)	Dwyer Series 616 Transducer- P2 (in. H2O)	Difference (in. H2O)
~0.25	0.26	0.25	0.01
~0.50	0.51	0.50	0.01
~0.75	0.77	0.75	0.02
~1.00	1.00	0.99	0.01
~1.50	1.50	1.48	0.02
~2.00	2.20	2.18	0.02
~2.50	2.60	2.58	0.02
		Average Difference =	0.02

Inches of Water	Ref. Manometer - Positive Leg (in. H2O)	Dwyer Series 616 Transducer- P3 (in. H2O)	Difference (in. H2O)
~0.25	0.26	0.26	0
~0.50	0.48	0.47	0.01
~0.75	0.75	0.74	0.01
~1.00	1.00	0.99	0.01
~1.50	1.65	1.63	0.02
		Average Difference =	0.01

Inches of Water	Ref. Manometer - Negative Leg (in. H2O)	Dwyer Series 616 Transducer- P4 (in. H2O)	Difference (in. H2O)
~0.25	0.23	0.22	0.01
~0.50	0.51	0.50	0.01
~0.75	0.76	0.74	0.02
~1.00	1.10	1.09	0.01
~1.50	1.60	1.59	0.01
		Average Difference =	0.01